SOC8200 Hardware User Manual

Version of 1.0

Release: 2010-07-10

Revision history

Rev	Date	Description
1.0	2010-07-10	Initial version

Thank you for purchasing our products, we will do better because of you.

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Chapter One: Overview

I System Overview

1.1 Introduction

Embest SOC8200 is a highly-integrated single board computer with PC104 form factor. It employs TI's high-performance AM3517 microcontroller which is based on 500Mhz ARM Cortex-A8 Core with NEON SIMD Coprocessor and POWERVR SGX™ Graphics Accelerator and offers video, image, and graphics processing capable of supporting single board computers, home and industrial automation, and digital signage.

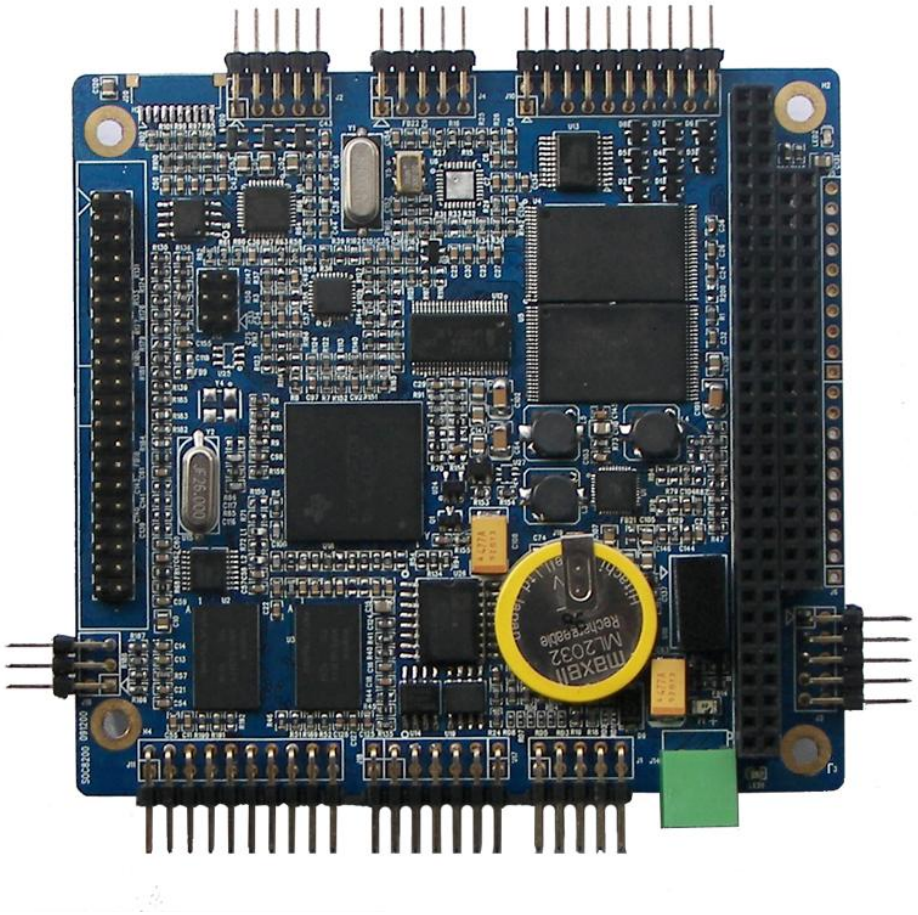


Fig 1-1 SOC8200 Single Board Computer

1.2 Define

HDMI : High Definition Multimedia Interface
DVI : Digital Visual Interface

1.3 Architecture diagram

The full system architecture diagram as follows:

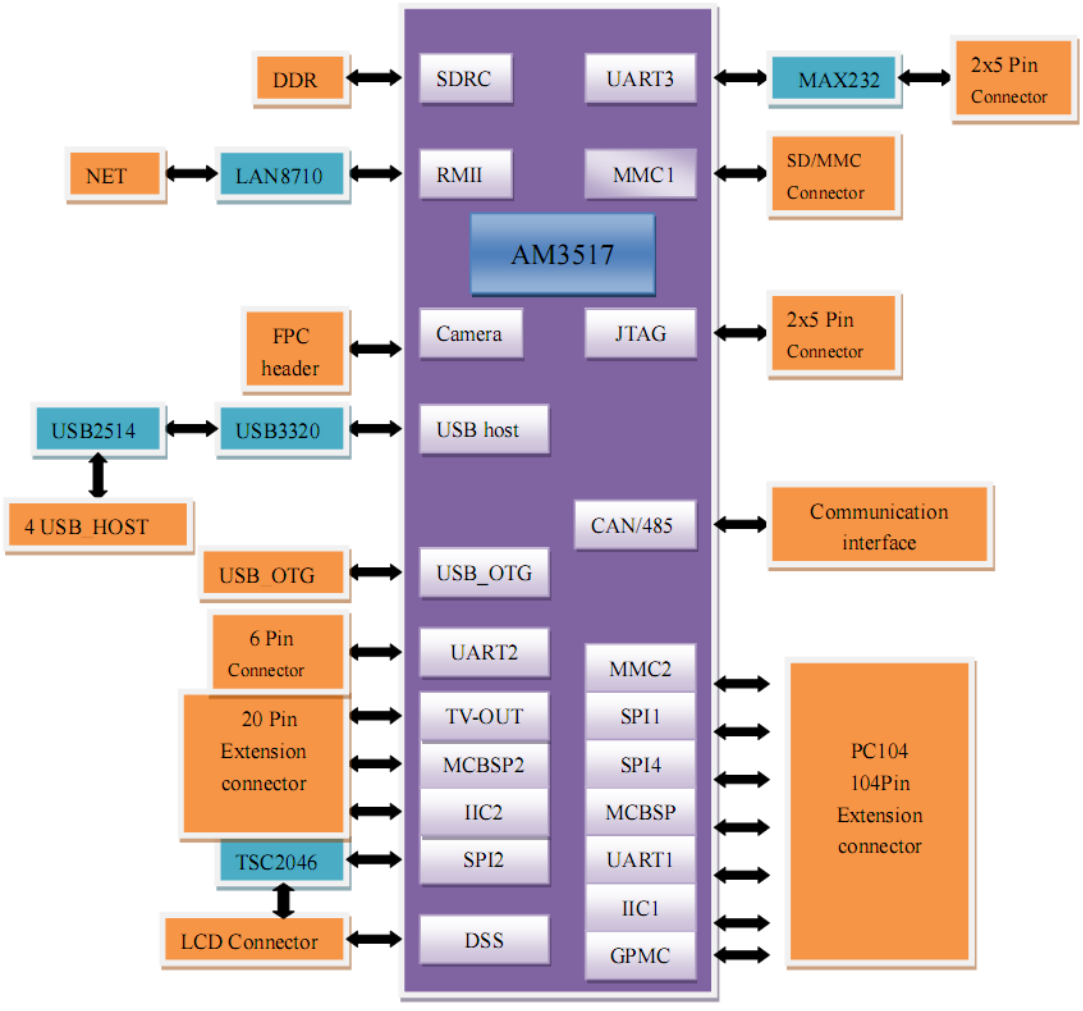


Fig1-3 SOC8200 architecture diagram

Chapter Two Hardware System

II System Overview

2.1 Single Board Computer

The SOC8200 board has onboard 256MB DDR2 SDRAM, 256MB Nand Flash and 4MB Nor Flash and extends various functions through pins including serial port, Ethernet, CAN, RS485, SD/MMC card, CF card, Audio In/Out, Camera, LCD, USB Host, USB Device, expansion connector and JTAG. Embest has designed an expansion board and function interface boards for the SOC8200. It would be convenient for customer to use the SOC8200 with the expansion board for evaluating the functionality of Texas Instruments' Sitara AM3517 microprocessor. And in the later period customer can add functions through function interface boards according to their own requirements which can effectively shorten the period of research and development of products and speed up time to market.

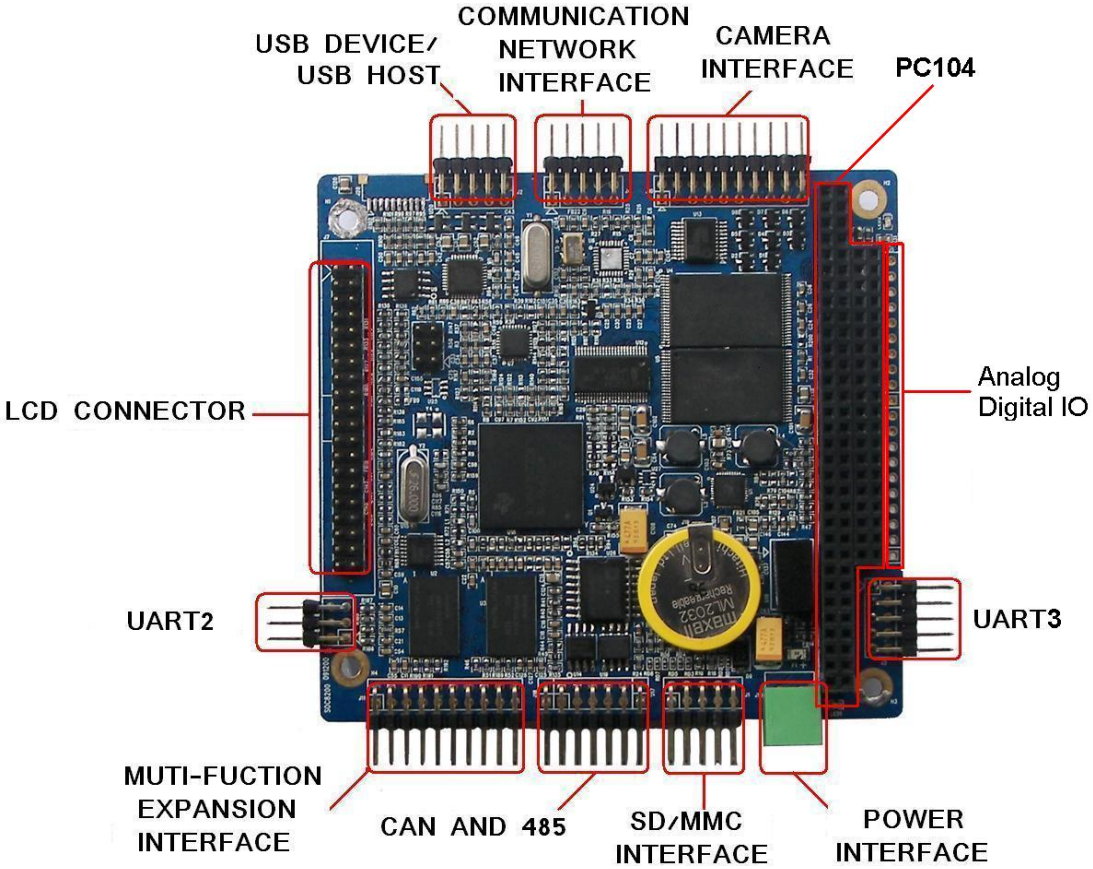


Fig2-1 SOC8200 Connection Diagram

2.2 Hareware Features

Processor

- OMAP3517 industrial applications processors
- NEON SIMD Coprocessor
- 500MHz ARM Cortex-A8 Core
- POWERVR SGX Graphics Accelerator (AM3517 only)
- 16KB I-Cache, 16KB D-Cache, 256KB L2-Cache, 112KB ROM, 64KB Share SRAM

Memory

- 256MB DDR2 SDRAM, 32bit
- 256MB NAND Flash, 8bit
- 4MB NOR Flash, 16bit

Signals Routed to Pins

- One 5-wire Debug serial port (RS232)
- One 5-wire serial port (TTL)
- Two USB 2.0 Host High-speed ports, 480Mbps
- One USB 2.0 Device High-speed port, 480Mbps
- Audio (IIS)
- 16-bit LCD output
- 10-bit Camera video input
- channel S-Video output
- channel AV output
- One RS485 serial port
- channel CAN bus
- 10/100Mbps
- SD/MMC card
- Multi-functional expansion interface (McBSP, IIC, McSPI, TV-OUT)
- PC104 expansion interface (GPMC Bus, MMC, USB, McSPI, UART1, Clock, HDQ)
- JTAG interface

2.3 Electric Characteristic

- SOC8200 Single Board Computer Dimensions: 96mm*90mm (8 layer PCB design)
- Input voltage: +5V
- Power Consumption: About 3W
- Working Temp.: -40℃~85℃
- Working Humidity: 20%~90%

2.4 Schematic

Please refer to the directory of **disk/HW design/schematic/**.

Warning: The schematic is used to refer, if the customer want to design produce by itself, we are afraid we can not provide any technic support on it.

2.5 Dimension Drawing

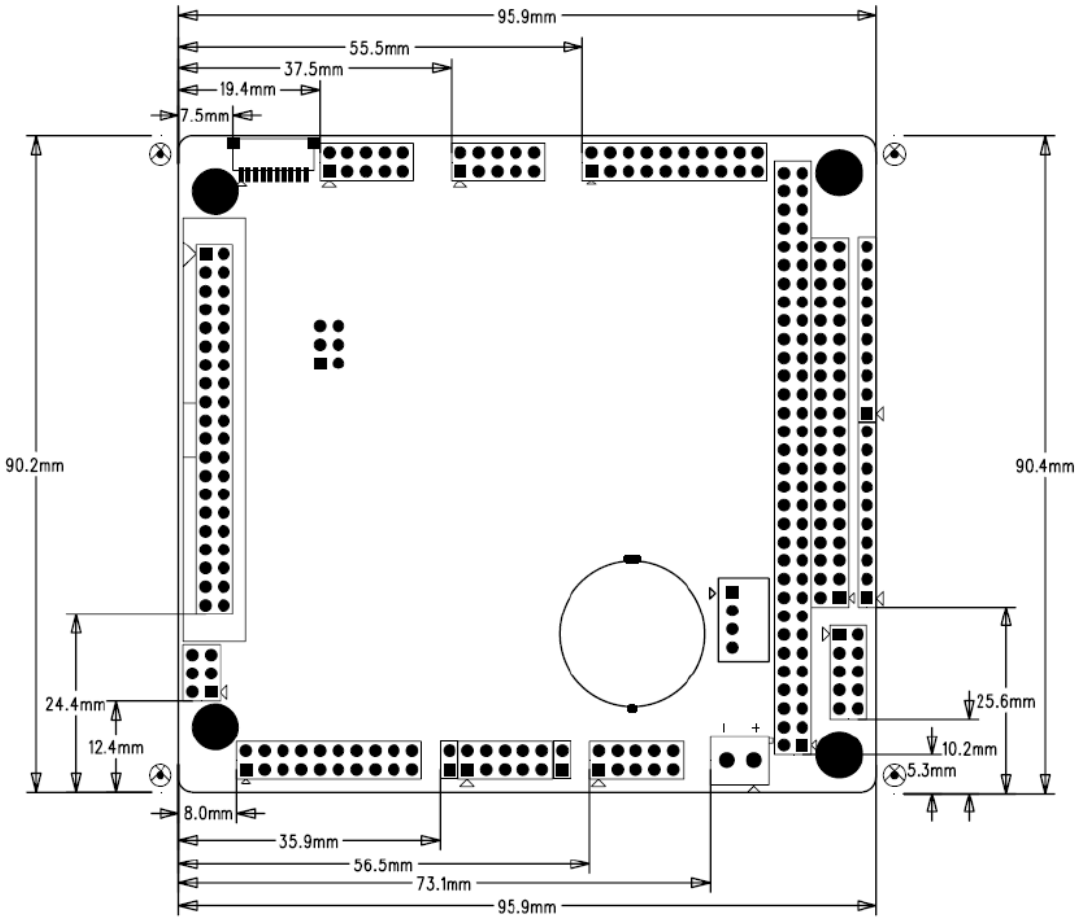


Fig2-5 Dimension Drawing

III Hardware specification

3.1 USB host & USB Interface

PIN	Description
1	OTG_DM
2	OTG_DP
3	OTG_BUS
4	OTG_ID
5	U1_DM
6	U1_DP
7	GND
8	POWER_USB
9	U2_DM
10	U2_DP

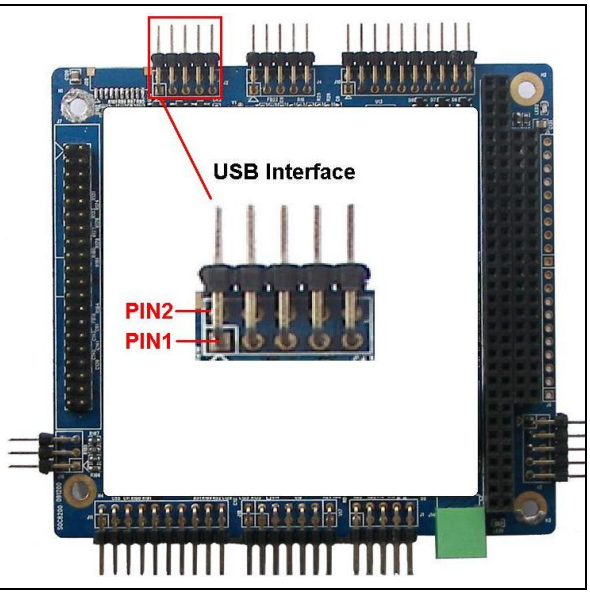


Fig3-1 USB host & USB device Interface

3.2 Network interface

SOC8200 is 10M/100M adaptive network interface

PIN	Description
1	GND
2	VCC_IO
3	TXN
4	TXP
5	GND
6	RXN
7	RXP
8	LED2/NINTSEL
9	LED1/REGOFF
10	GND

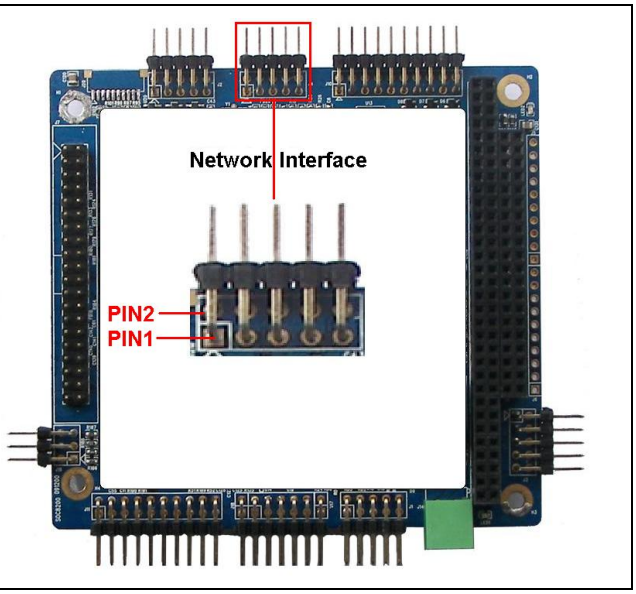


Fig3-2 Network Interface

3.3 Camera Interface

PIN	Description
1	GND
2	CAM_D0
3	CAM_D1
4	CAM_D2
5	CAM_D3
6	CAM_D4
7	CAM_D5
8	CAM_D6
9	CAM_D7
10	CAM_D8
11	CAM_D9
12	GND
13	CAM_PCLK
14	GND
15	CAM_HS
16	CAM_VS
17	VCC_IO
18	IIC3_SDA
19	IIC3_SCL
20	GND

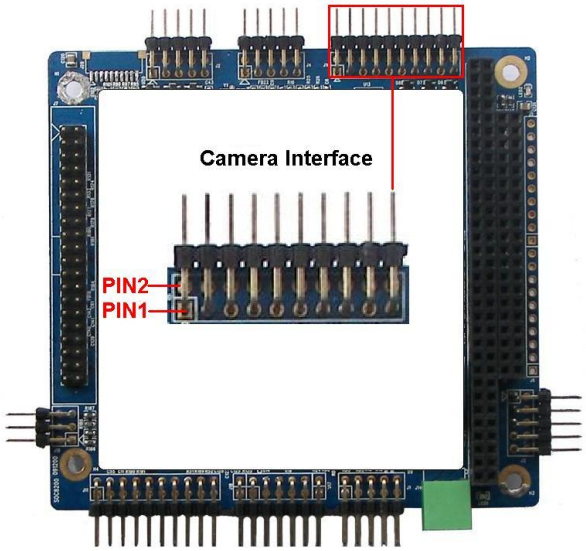


Fig3-3 Camera Interface

3.4 MMC Interface

PIN	Description
1	VCC_IO
2	MMC1_CLK
3	MMC1_CMD
4	MMC1_D0
5	MMC1_D1
6	MMC1_D2
7	MMC1_D3
8	MMC1_CD
9	MMC1_WP
10	GND

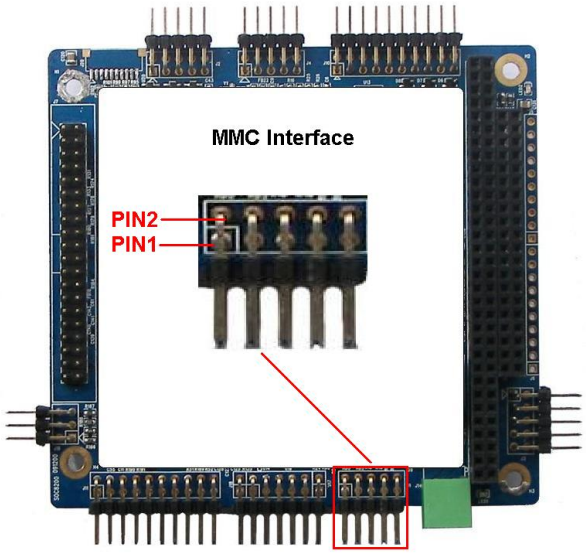


Fig3-4 MMC Interface

3.5 UART1 Interface

PIN	Description
1	N/A
2	N/A
3	R1IN
4	T2OUT
5	T1OUT
6	R2IN
7	N/A
8	N/A
9	GND
10	N/A

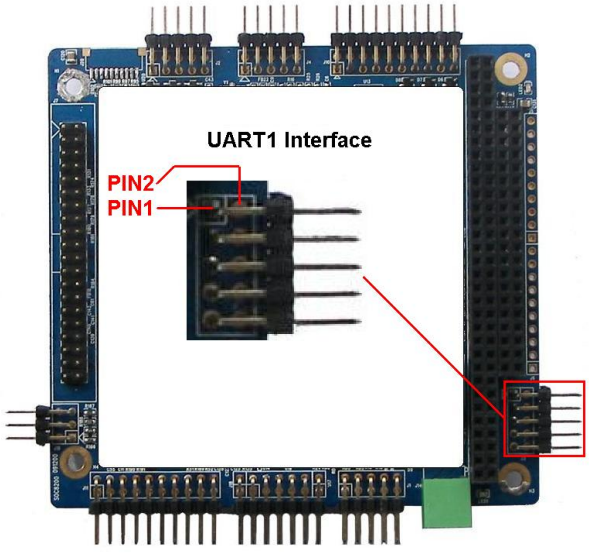


Fig3-5 UART1 Interface

3.6 Analog IO Interface

PIN	Description
1	CH7
2	CH6
3	CH5
4	CH4
5	CH3
6	CH2
7	CH1
8	CH0
9	GND
10	VCC_IO

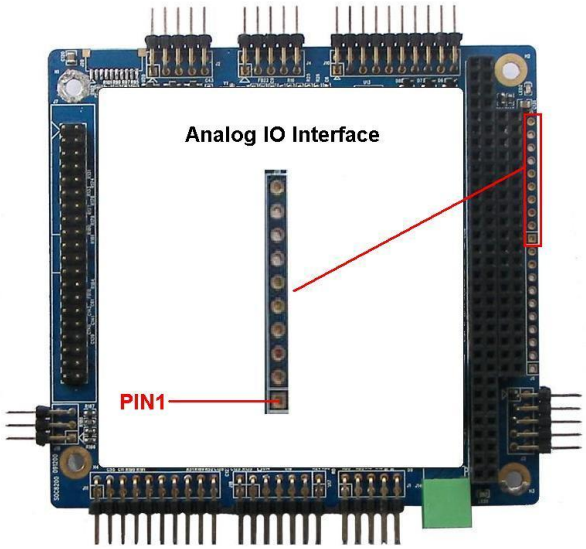


Fig3-6 Analog IO Interface

3.7 Digital IO Interface

PIN	Description
1	CH7
2	CH6
3	CH5
4	CH4
5	CH3
6	CH2
7	CH1
8	CH0
9	GND
10	VCC_IO

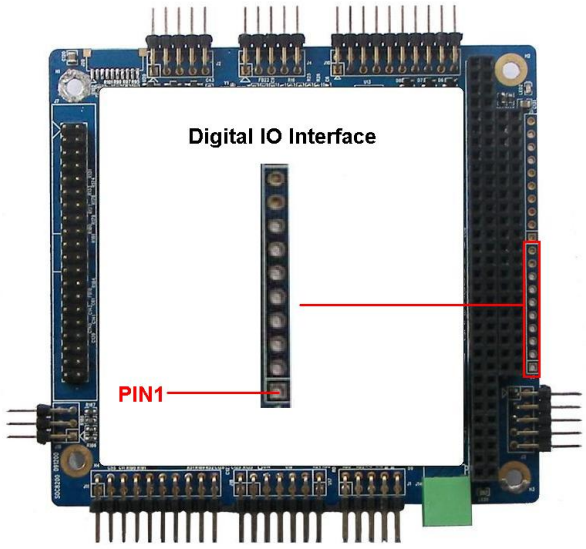
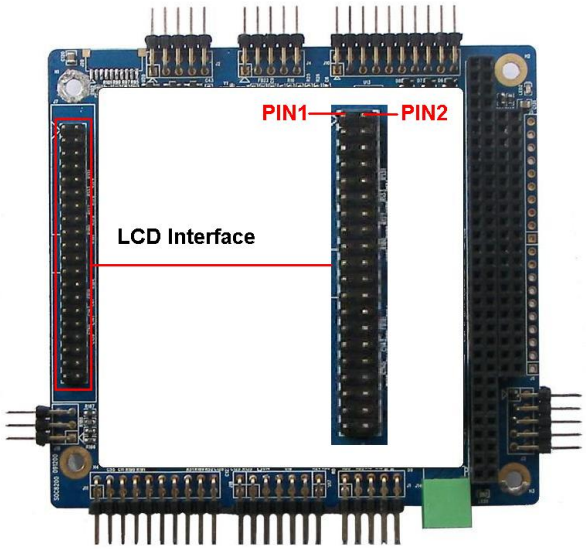


Fig3-7 Digital IO Interface

3.8 TFT_LCD Interface

PIN	Description
1	GND
2	DSS_CLK
3	DSS_HS
4	DSS_VS
5	GND
6	N/A
7	DSS_D11
8	DSS_D12
9	DSS_D13
10	DSS_D14
11	DSS_D15
12	GND
13	DSS_D5
14	DSS_D6
15	DSS_D7
16	DSS_D8
17	DSS_D9
18	DSS_D10
19	GND
20	N/A
21	DSS_D0
22	DSS_D1
23	DSS_D2
24	DSS_D3
25	DSS_D4
26	GND
27	DSS_DEN
28	VCC_IO
29	VCC_IO
30	N/A
31	N/A
32	Y+
33	X-
34	Y-
35	X+
36	LCD_PEN
37	VCC_5V
38	LCD_ADJ



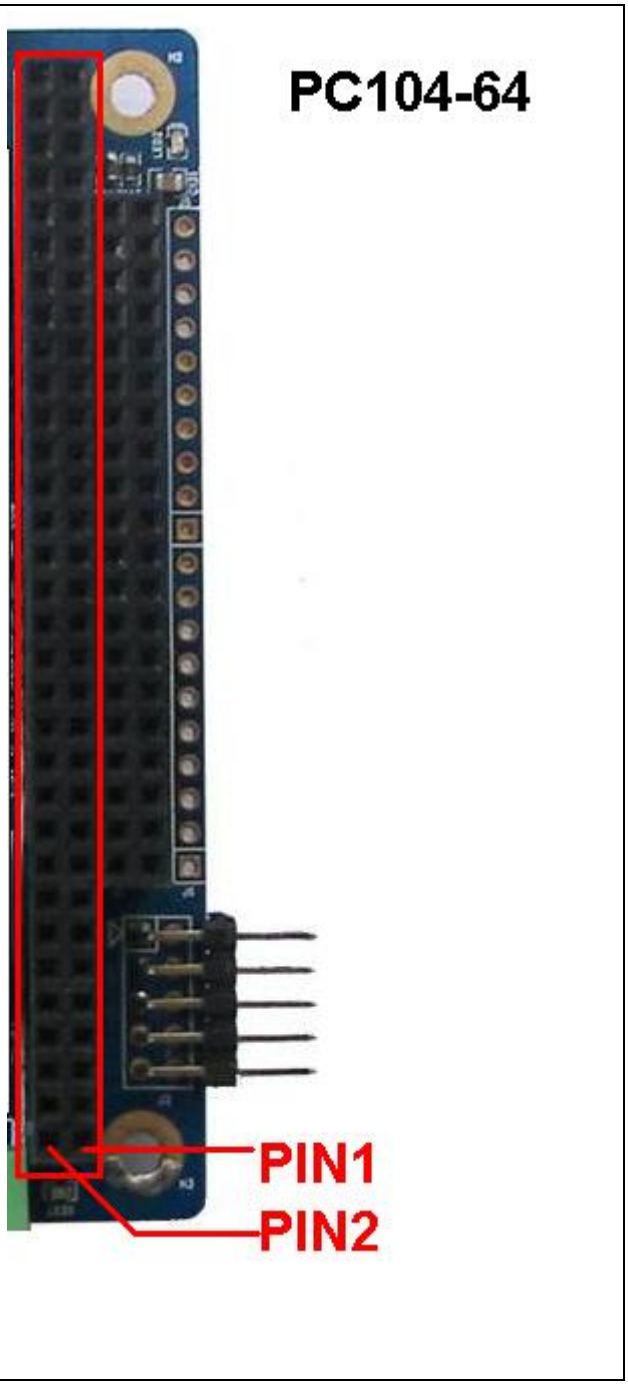
39	GND	
40	N/A	

Fig3.8 TFT_LCD Interface

3.9 PC104 Interface

3.9.1 PC104-64

PIN	Description
1	GND
2	N/A
3	VCC_5V
4	VCC_5V
5	VCC_IO
6	VCC_IO
7	GND
8	SYS_RST
9	POWER_RST
10	SYS_CLKOUT2
11	SYS_CLKOUT1
12	HDQ_SIO
13	SYS_32K
14	GND
15	IRQ
16	GPIO58
17	GPIO57
18	GPIO56
19	GPT11
20	GPT10
21	GPT9
22	IIC1_SDA
23	IIC1_SCL
24	GND
25	UART4_RX
26	RS485_TXEN
27	RS485_RXEN
28	UART4_TX
29	GND
30	MCBSP4_DX
31	MCBSP4_DR



32	MCBSP4_CLKX	
33	MCBSP4_FSX	
34	MCBSP_CLKS	
35	GND	
36	GPIO157	
37	GPIO162	
38	SPI4_CS0	
39	SPI4_SOMI	
40	SPI4_SIMO	
41	SPI4_CLK	
42	GND	
43	SPI1_CS3	
44	SPI1_CS2	
45	SPI1_SOMI	
46	SPI1_SIMO	
47	SPI1_CLK	
48	GND	
49	MMC2_D7	
50	MMC2_D6	
51	MMC2_D5	
52	MMC2_D4	
53	MMC2_D3	
54	MMC2_D2	
55	MMC2_D1	
56	MMC2_D0	
57	MMC_CMD	
58	MMC2_CLK	
59	GND	
60	U3_DP	
61	U3_DM	
62	U4_DM	
63	U4_DP	
64	GND	

Fig3-9-1 PC104-64 Interface

3.9.2 PC104-40

PIN	Description
1	GND
2	GPMC_NCS4
3	GPMC_NCS3
4	GPMC_NCS2
5	GPMC_A10
6	GPMC_A9
7	GPMC_A8
8	GPMC_A7
9	GPMC_A6
10	GPMC_A5
11	GPMC_A4
12	GPMC_A3
13	GPMC_A2
14	GPMC_A1
15	GPMC_NBE1
16	GPMC_WAIT3
17	SYS_RST
18	GPMC_CLE
19	GND
20	GPMC_ALE
21	GPMC_CLK
22	GPMC_WE
23	GPMC_OE
24	GPMC_D15
25	GPMC_D14
26	GPMC_D13
27	GPMC_D12
28	GPMC_D11
29	GPMC_D10
30	GPMC_D9
31	GPMC_D8
32	GPMC_D7
33	GPMC_D6
34	GPMC_D5
35	GPMC_D4
36	GPMC_D3
37	GPMC_D2
38	GPMC_D1
39	GPMC_D0

40	GND	

Fig3-9-2 PC104-40Interface

3.10 Multifunctional Expansion Interface

PIN	Description
1	GND
2	TV_OUT1
3	GND
4	TV_OUT2
5	GND
6	VCC_IO
7	GND
8	MCBSP2_CLKX
9	MCBSP2_FSX
10	MCBSP2_DR
11	MCBSP2_DX
12	IIC2_SDA
13	IIC2_SCL
14	GND
15	SPI2_CLK
16	SPI2_SIMO
17	SPI2_SOMI
18	SPI2_CS0
19	SPI2_CS1
20	GND

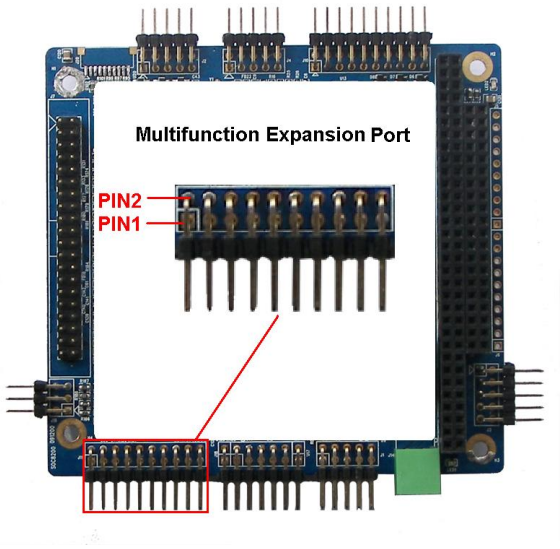


Fig3-10 USB_HOSTInterface

3.11 Can/485 Interface

PIN	Description
1	CANH
2	CANH
3	CANL
4	CANL
5	CHGND
6	CHGND
7	RS485A
8	RS485B
9	RS485Z
10	RS485Y
11	MCBSP2_DX
12	IIC2_SDA
13	IIC2_SCL
14	GND
15	SPI2_CLK
16	SPI2_SIMO
17	SPI2_SOMI
18	SPI2_CS0
19	SPI2_CS1
20	GND

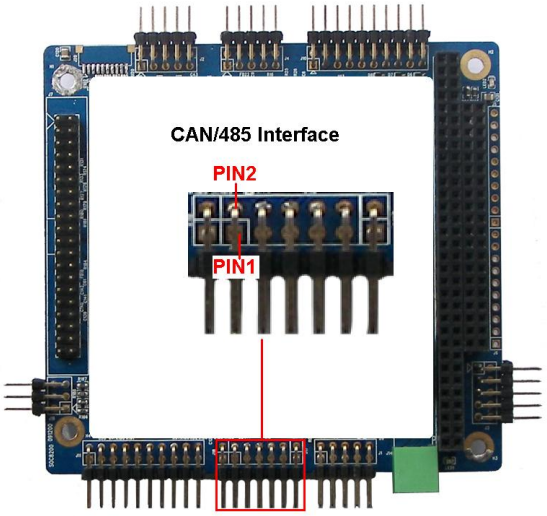


Fig3-11 RS232 Interface

3.12 Power Interface

PIN	Description
1	VCC_5V
2	GND

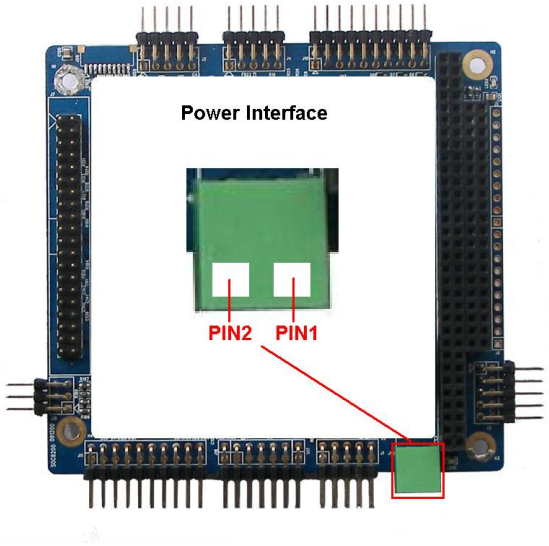


Fig3-12 Power Interface

3.13 UART(TTL) Interface

PIN	Description
1	VCC_IO
2	GND
3	UART2_CTS
4	UART2_RTS
5	UART2_TX
6	UART2_RX

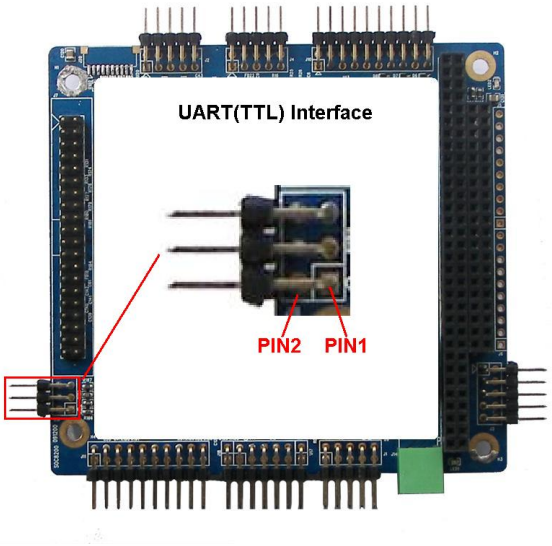


Fig3-13 UART(TTL) Interface

3.14 JTAG Interface

PIN	Description	
1	VCC	
2	TMS	
3	TDI	
4	NTRST	
5	TD0	
6	RTCK	
7	TCK	
8	EMU0	
9	EMU1	
10	GND	

Fig3-14 JTAG Interface

Appendix

Appendix I Expansion Board Overview

The customer can evaluate the AM3517 via SOC8200 expansion board, to experiences the AM3517 processor, The customer can use **single board computer** and **function Interface board**, **Communication board** to add the product functions, thus reducing product development cycles, achieve faster time to market.

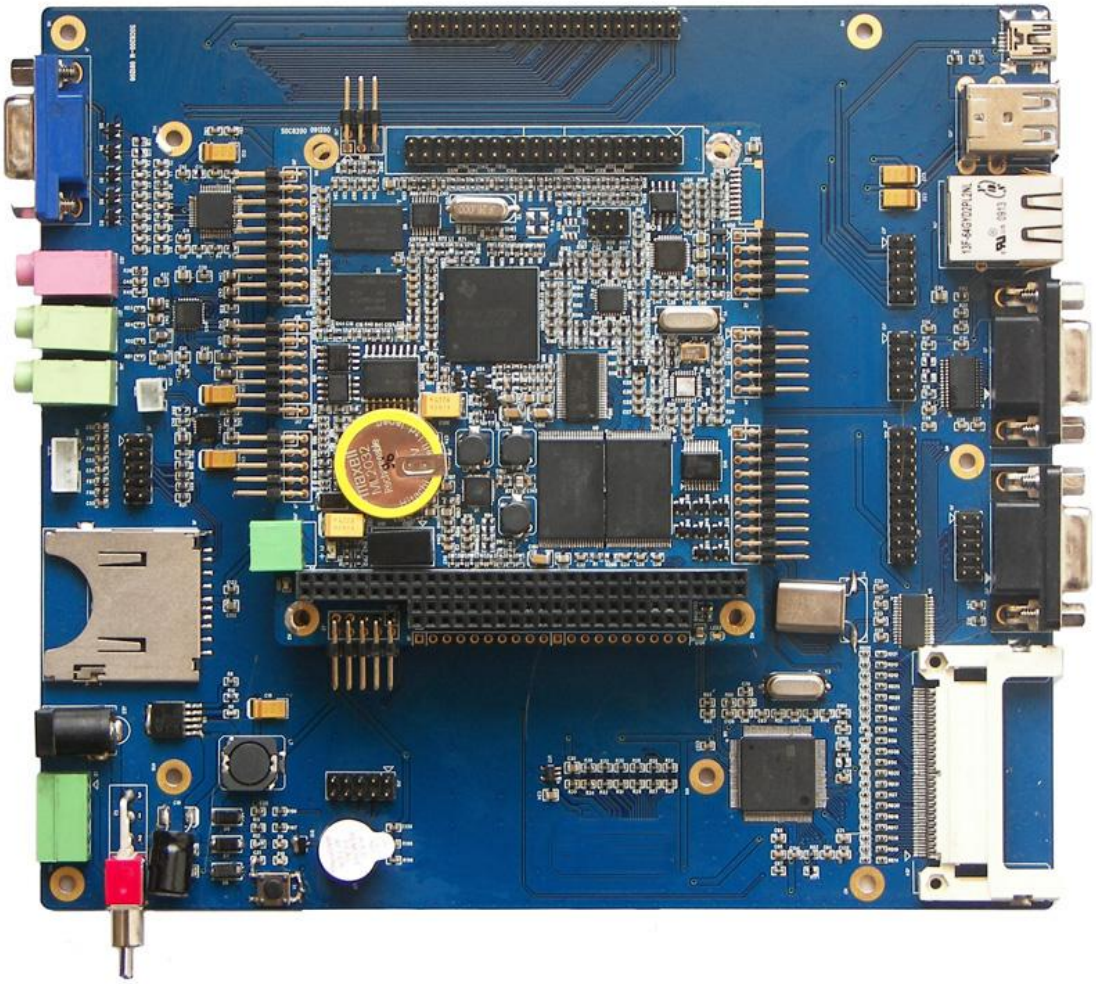


Fig SOC8200 Development Devkit

✓ **SOC8200 Expansion Board**

Audio/Video Interface

- Audio input port
- Stereo audio output port
- 15-pin standard VGA output interface
- Buzzer

Communication Interface

- One 5-wire RS232 serial port (DB9)
- One 9-wire RS232 serial port (DB9)
- One 9-wire TTL serial port (2*5pin 2.5mm pitch connector)
- Two High-speed USB 2.0 Host ports, 480Mbps
- One High-speed USB 2.0 Device port, 480Mbps
- One 10/100Mbps Ethernet port (RJ45)
- 10-bit Camera interface
- Reset button
- SD/MMC card slot
- CF card slot

Electric Characteristic

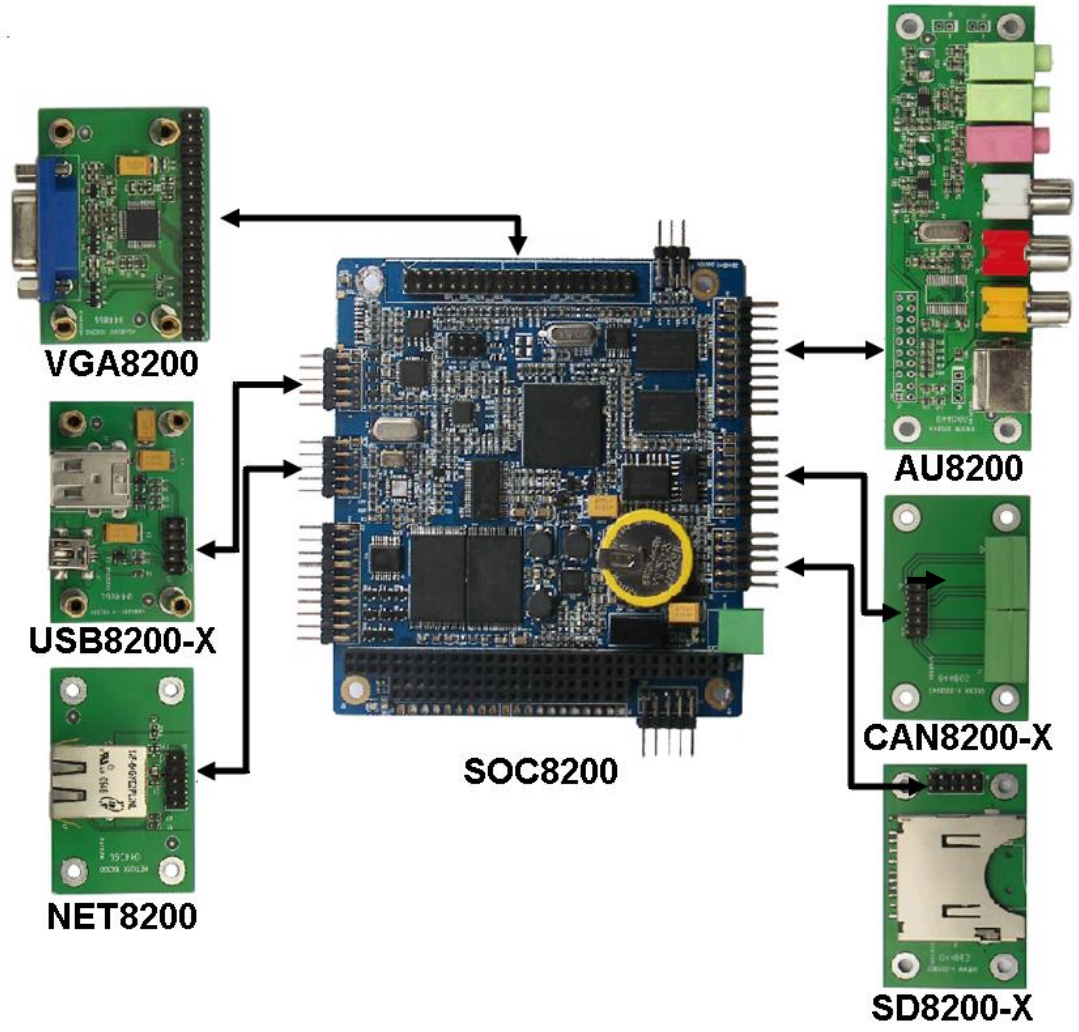
- SOC8200 Expansion Board Dimensions: 170mm*190mm

Item	SOC8200 Development Kit
Hardware	• One SOC8200 Single Board Computer with Expansion Board • One 512MB SD card • One S-Video cable • One Serial cable • One USB Device cable • One Ethernet cable • One 5V@2A Power adapter • One CD (including software and documents)
Software and Documents	• Documents (user manual, schematic drawing, Datasheet) • Linux 2.6 BSP
Options	10.4”TFT LCD (LCD8000-104T, Resolution 800*600) 7”TFT LCD (LCD8000-70T, Resolution 800*480) 4.3”TFT LCD (LCD8000-43T, Resolution 480*272） VGA Module Analog Camera Module Function Interface Boards (AV, CAN, COM-Debug, NET, SD/TF, USB)
Price	Please contact us.

Appendix II Function Interface Board

In order to facilitate rapid customization of products, Embest launch function interface board based on SOC8200 Single Board Computer, to make the every function modulization.

Each module can be built up through the copper pillar and then through the cable connected to the SOC8200 signal board computer.



ECOM-4 & ECOM-8

Warning: The function interface board has not Retails.

Welcome bulk orders.

Please Connect us.

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Technical support and Warranty Service

Technical support service :

Timll provide one year free technical support service for all products Timll is selling. Technical support service covers:

- Timll embedded platform products software/hardware materials
- Assist customers compile and run the source code we offered
- Solve the problems accurate on embed software/hardware platform if user was following the instruction in the documentary we offered
- Judge if the product failure is existing

Special explanation, the situations listed below have NOT been included in the range of our free technical support service, Timll will handle the situation with discretion:

- Software/Hardware issues user met during the self-develop process
- Issues happened when users compile/run the embedded OS which was tailored by users themselves
- User's own application
- Problems happened during the modification of our software source code

Maintenance service clause:

1. The products, which was used properly, will take the warranty since the day of the sale:

   PCB: Provide 12 months free maintenance service

2. The situations listed below have NOT been included in the range of our free maintenance service, Timll will charge the service fee with discretion:

   A. Can't provide valid Proof-of-Purchase, the identification label was tour up or illegible, the identification label was altered or not accord with the actual products;
   B. Didn't follow the instruction of the manual in order to damage the product
   C. Due to the natural disasters (unexpected matters), or natural attrition of the components, or unexpected matters leads the defects of appearance/function;
   D. Due to the power supply, bump, leaking of the roof, pets, moist, impurities

into the boards, all those reasons which lead the defects of appearance/function;

E. User unauthorized weld or dismantle parts leads the product's bad condition, or let other people or institution which was not authorized by Timll to dismantle, repair, change the product leads the product bad connection or defects of appearance/function;

F. User unauthorized install the software, system or incorrect configuration or computer virus leads the defects;

G. Purchase the products through unauthorized channel;

H. Those commitment which was committed by other institutions should be responsible by the institutions, Timll has nothing to do with that；

3. During the warranty period, the deliver fee which delivery to Timll should be covered by user, Timll will pay for the return delivery fee to user when the product was repaired. If the warranty period is expired, all the deliver fees will be charged by users.

4. When the boards needs repair, please contact technical support department.

Note: Those products was returned without the permission of our technician, we will not take any responsibility for them.

Base notice to protect and maintenance LCD:

- Do not use finger nails or hard sharp object to touch the surface of the LCD, otherwise user can't enjoy the above service
- Timll recommend user to purchase a piece of special wiper to wipe the LCD after long time use , please avoid clean the surface with fingers or hands to leave fingerprint
- Do not clean the surface of the screen with chemicals, otherwise user can not enjoy above service.

Value Added Services:

We will provided following value added services:

- Provided services of driver develop base on Timll embedded platform, like serial port, USB interface devices, LCD screen.
- Provided the services of control system transplant, BSP drivers develop, API software develop.
- Other value added services like power adapter, LCD parts.
- Other OEM/ODM services.
- Technically training.

Please connect Timll and get technical support:

- Support Tel:+86-755-25503401
- Fax:+86-755-25616057
- Pre-Sale consultation:sales@timll.com
- After-Sale consultation:support@timll.com